8.11 THE CSU SEA-POL SHIP-BOARD RADAR: SALIENT FEATURES AND FIRST RESULTS

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Sea-Pol is ship- and land-deployable dual-polarization meterological radar system developed at Colorado State University. It is designed for operation aboard Global-class research ships operated by the US oceanographic community. The radar operates at C-band (5.65 GHz) and has a 4.3 meter stabilized antenna system. An inertial navigation unit (INU) is used to measure and compensate for ship platform motion. The radar can operate in simultaneous-transmit, simultaneous-receive (STSR) mode, as well as horizontal-transmit, simultaneous-receive mode. The radar uses a 250 kW coaxial magnetron transmitter capable of a variety of pulse widths and PRFs within a 0.12% duty cycle limit. The radar has a sensitivity of -7 dBZ at 100 km range. The radar is designed to be easily transported by virtue of being packaged in standard ISO-668 1C containers. Special care was taken to make Sea-Pol rapidly deployable and able to withstand the harsh environmental conditions aboard research ships on the open ocean.

The radar completed its first deployment cruise aboard the R/V Revelle in the Inter-tropical Convergence Zone (ITCZ) in Pacific Ocean between October and November 2017. This was part of the SPURS-2 campaign, designed to study the fate of freshwater rain puddles on the upper ocean. Sea-Pol provided rainfall rate estimation over a 150 km range around the ship.

The paper presents an engineering overview of the radar, including its salient features that make it a world-class instrument. The dynamic stabilization system performance is shown. We then present example cases of data recorded during the SPURS-2 campaign. Data was recorded during various regimes, including rare thunderstorm activity over the open oceans and stratiform precipitation.

In summary, the Sea-Pol radar was developed and successfully deployed in a marine environment. Measurements taken while at sea demonstrated very good dual-polarization performance, and showed that the platform stabilization system suppressed platform motion to within 0.1°.